

What is claimed is:

1           1.     A user request processing method, using an upstream channel, after a  
2     three-dimensional scene generated based on a binary format, is transmitted from a  
3     server to a terminal, the user request processing method comprising the steps of:

4           (a) setting downstream/upstream channels between the server and the  
5     terminal as initialization;

6           (b) the terminal forming an upstream channel message if a user request of  
7     predetermined processing of a predetermined object is occurred in a scene  
8     transmitted from the server to the terminal through the downstream channel, and  
9     transmitting the message to the server through the upstream channel;

10          (c) the server receiving the upstream channel message, interpreting the  
11     message, processing the message as the user request of predetermined  
12     processing, and transmitting the result to the terminal; and

13          (d) the terminal substituting the processing result of step (c) for the  
14     predetermined object in the scene transmitted in step (b), and providing it to the  
15     user.

1           2.     The user request processing method of claim 1, wherein step (b)  
2     further comprises the steps of:

3           (b1) defining the corresponding node in the scene, in which the user request  
4     occurred, using information on objects forming the transmitted scene;

5           (b2) determining the node identifier of the defined node, using information on  
6     the objects;

7           (b3) defining a command to be executed in the server for the defined node, in  
8     response to the user request; and

9           (b4) forming an upstream channel message containing the node identifier and  
10     the command.

1           3.     The user request processing method of claim 2, wherein the  
2     information on the objects contains node identifiers based on sequence information  
3     or locations of nodes corresponding to the objects in the scene generated based on  
4     a binary format.

1           4.     The user request processing method of claim 2, wherein step (b2)  
2 further comprises the steps of:  
3           (b2-1) determining whether or not the defined node is reusable in the scene,  
4 by the presence of a node identifier;  
5           (b2-2) if a node identifier assigned for reuse is in the defined node, using the  
6 node identifier; and  
7           (b2-3) if a node identifier assigned for reuse is not in the defined node, using  
8 a node identifier which has a node identifier and is immediately above the defined  
9 node.

1           5.     The user request processing method of claim 4, wherein in step (b2-3),  
2 if the defined node and all other nodes in the scene are not reusable, the node  
3 identifier of the defined node is determined as a value which is for all nodes as  
4 subjects.

1           6.     The user request processing method of claim 2, wherein step (c)  
2 further comprises the steps of:  
3           (c1) receiving the upstream channel message, interpreting the node identifier  
4 in the upstream channel message, and defining a subject node to be processed; and  
5           (c2) if a subject node to be processed is defined, confirming a node command  
6 in the upstream channel message, and processing the subject node according to the  
7 node command.

1           7.     The user request processing method of claim 6, wherein in step (c1),  
2 the subject node is defined after confirming at least whether or not the node  
3 identifier is for a node contained in the scene, and the structure type of the node  
4 indicated by the node identifier.

1           8.     The user request processing method of claim 7, wherein in step (c1),  
2 a subject node is defined after confirming information on nodes directly dependent  
on the node indicated by the node identifier.

1           9.     The user request processing method of claim 7, wherein in step (c1), if  
2     the node identifier is a value for all the nodes in the scene as subjects, all the nodes  
3     in the scene are defined as subject nodes.

1           10.    The user request processing method of any one of claims 1 through 9,  
2     wherein the scene is generated based on a moving picture expert group (MPEG)-4  
3     binary format in an MPEG-4 system, the server has an MPEG-4 scene encoder, and  
4     the terminal has an MPEG-4 scene decoder.

1           11.    A user request processing apparatus using an upstream channel in a  
2     system providing bidirectional communication services, the user request processing  
3     apparatus comprising:

4           a server for transmitting through a downstream channel a three-dimensional  
5     scene generated based on a binary format, receiving and interpreting an upstream  
6     channel message, and processing the message as user's request of predetermined  
7     processing; and

8           a terminal for forming an upstream channel message if a user request of  
9     predetermined processing for a predetermined object in the scene transmitted from  
10    the server occurs, and transmitting the message to the server through an upstream  
11    channel.

1           12.    The user request processing apparatus of claim 11, wherein the  
2     terminal comprises:

3           a node interpreter for defining a corresponding node in the scene, for which  
4     the user request occurred, using information on the objects forming the transmitted  
5     scene;

6           a node identifier determiner for determining a node identifier of the defined  
7     node, using information on the objects;

8           a command generator for defining a command to be processed in the server,  
9     in response to the user request for the defined node; and

10          an upstream channel message transmitter forming an upstream channel  
11    message containing the node identifier and the command.

1 13. The user request processing apparatus of claim 12, wherein  
2 information on the objects includes node identifiers according to sequence  
3 information or locations of nodes corresponding to objects in the scene generated  
4 based on the binary format.

1 14. The user request processing apparatus of claim 12, wherein the node  
2 identifier determiner further comprises:

3 a node identifier presence determiner for determining whether or not the  
4 defined node is reusable in the scene, by the presence of a node identifier, and if a  
5 node identifier assigned for reuse exists in the defined node, using the  
6 corresponding node identifier; and

7 a node identifier generator for using the node identifier of a node, which is  
8 immediately above the defined node and has a node identifier, if a node identifier  
9 assigned for reuse does not exist in the defined node.

1 15. The user request processing apparatus of claim 14, wherein the node  
2 identifier generator sets the node identifier of the defined node to a value for all  
3 nodes as subjects, if the defined node and all other nodes in the scene are not  
4 reusable.

1 16. The user request processing apparatus of claim 12, wherein the server  
2 comprises:

3 an upstream channel message receiver for receiving the upstream channel  
4 message;

5 a node interpreter for interpreting the node identifier in the upstream channel  
6 message and defining subject nodes to be processed; and

7 a command processor for confirming node commands in the upstream  
8 channel message, if the subject nodes are defined, and processing the subject  
9 nodes according to the node commands.

1 17. The user request processing apparatus of claim 16, wherein the node  
2 interpreter defines a subject node after confirming at least whether or not the node

3 identifier is for a node contained in the scene, and the structure type of the node  
4 indicated by the node identifier.

1 18. The user request processing apparatus of claim 17, wherein the node  
2 interpreter defines a subject node after confirming information on nodes directly  
3 dependent on the node indicated by the node identifier.

1 19. The user request processing apparatus of claim 17, wherein the node  
2 interpreter defines all the nodes in the scene as subject nodes if the node identifier  
3 is a value for all the nodes in the scene as subjects.

1 20. The user request processing apparatus of any one of claims 11  
2 through 19, wherein the scene is generated based on a moving picture expert group  
3 (MPEG)-4 binary format in an MPEG-4 system, the server has an MPEG-4 scene  
4 encoder, and the terminal has an MPEG-4 scene decoder.

1 21. A user request processing method using an upstream channel in  
2 interactive multimedia contents services, the user request processing method  
3 comprising the steps of:

4 (a) setting downstream/upstream channels between the server and the  
5 terminal as initialization;

6 (b) the terminal forming an upstream channel message if a user request of  
7 predetermined processing of a predetermined element is occurred in a multimedia  
8 content transmitted from the server to the terminal through the downstream channel,  
9 and transmitting the message to the server through the upstream channel;

10 (c) the server receiving the upstream channel message, interpreting the  
11 message, processing the message as the user request of predetermined  
12 processing, and transmitting the result to the terminal; and

13 (d) the terminal substituting the processing result of step (c) for the  
14 predetermined element in the multimedia content transmitted in step (b), and  
15 providing it to the user.

1           22.    The user request processing method of claim 21, wherein the  
2   upstream channel message in step (b) is formed to have at least an inherent  
3   identifier, which can be confirmed in a server assigned for the predetermined  
4   element, and a command corresponding to the user request of predetermined  
5   processing.

1           23.    A user request processing apparatus using an upstream channel in a  
2   system providing bidirectional communication services, the user request processing  
3   apparatus comprising:

4           a server for transmitting multimedia contents through a downstream channel,  
5   receiving and interpreting an upstream channel message, and processing the  
6   message as user's request of predetermined processing; and

7           a terminal for forming an upstream channel message if a user request of  
8   predetermined processing for a predetermined element in the multimedia contents  
9   transmitted from the server occurs, and transmitting the message to the server  
10   through an upstream channel.

1           24.    The user request processing apparatus of claim 23, wherein the  
2   upstream channel message in step (b) is formed to have at least an inherent  
3   identifier, which can be confirmed in a server assigned for the predetermined  
4   element, and a command corresponding to the user request of predetermined  
5   processing.